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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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10/828,475

04/21/2004

Yoshihisa Dotta

1035-506

7094

23117

7590

12/29/2005

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EXAMINER

NADAV, ORI

ART UNIT

PAPER NUMBER

2811

DATE MAILED: 12/29/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

| | | | |
|------------------------------|-----------------|--------------|--|
| Office Action Summary | Application No. | Applicant(s) | |
| | 10/828,475 | DOTTA ET AL | |
| | Examiner | Art Unit | |
| | Ori Nadav | 2811 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 19 October 2005.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,2 and 4-21 is/are pending in the application.
- 4a) Of the above claim(s) 10-16 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,2,4-9 and 17-21 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-2, 4-9 and 17-20 are rejected under 35 U.S.C. 102(b) as being anticipated by Finnila (5,426,072).

Finnila teaches in figure 7 and related text a semiconductor apparatus, comprising:

a semiconductor substrate 29, 11, 12 (see figure 6);

a field oxide film 13 formed over a surface of the semiconductor substrate, the field oxide film having an aperture section (the aperture section is the section between the most right FOX region and the middle FOX region);

a pad electrode 32, having an aperture section formed over the field oxide film, and

a penetration electrode 21 (the right electrode located between the two FOX regions) electrically connected to the pad electrode 32 via the aperture section of the field oxide film via a hole formed in the semiconductor substrate, and via the aperture section of the pad electrode,

the hole in the semiconductor substrate being formed entirely in the aperture section of the field oxide film, when perpendicularly viewing the semiconductor substrate, so that an opening of the hole is smaller than the aperture section,

wherein the penetration electrode is formed in a field area of the surface of the semiconductor substrate,

wherein an insulating film 15 (see figure 4) is formed on an internal surface of the hole, between the internal surface of the hole and a sidewall of the penetration electrode,

wherein the penetration electrode includes an electrically conductive film 16 on the insulating film that is formed on the internal surface of the hole,

wherein the penetration electrode includes a hole-filling section formed in the hole,

wherein the hole-filling section is made of an insulating material and of an electrically conductive material.

Regarding the claimed limitation of a penetration electrode 21 electrically connected to the pad electrode 32, as recited in claims 1, 18 and 19, although figure 7 does not depict a penetration electrode 21 electrically connected to the pad electrode 32, pad electrode 32 replaces bump 23 in figure 6, and a penetration electrode 21 is electrically connected to the bump 23. Therefore, Finnila teaches in figure 7 a penetration electrode 21 electrically connected to the pad electrode 32, as claimed.

Regarding claim 4, Finnila teaches in figure 7 the aperture section of the field oxide film is formed in the aperture section of the pad electrode, when perpendicularly viewing the semiconductor substrate.

Regarding claim 17, Finnila teaches in figure 7 a pad electrode formed so that there is no overlap with the hole when perpendicularly viewing the semiconductor substrate.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 21 is rejected under 35 U.S.C. 103(a) as being unpatentable over Finnila (5,426,072).

Finnila teaches in figure 7 and related text substantially the entire claimed structure, as applied to claims 1 and 4 above, except the aperture section in the pad electrode is larger than the aperture section in the field oxide film, when perpendicularly viewing the semiconductor substrate.

It appears from figure 7 that the aperture section in the pad electrode is larger than the aperture section in the field oxide film (see figure 6), when perpendicularly viewing the semiconductor substrate. It would have been obvious to a person of ordinary skill in the art at the time the invention was made to form the aperture section in the pad electrode larger than the aperture section in the field oxide film, when perpendicularly viewing the semiconductor substrate in Finnila's device in order to form the device as appears to be taught by Finnila.

Response to Arguments

Applicant's arguments with respect to claims 1-2, 4-9 and 17-21 have been considered but are moot in view of the new ground(s) of rejection.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ori Nadav whose telephone number is 571-272-1660. The examiner can normally be reached between the hours of 7 AM to 4 PM (Eastern Standard Time) Monday through Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eddie Lee can be reached on 571-272-1732. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



O.N.
12/26/05

ORI NADAV
PRIMARY EXAMINER
TECHNOLOGY CENTER 2800